



Raidho Acoustics

# ADVANCED USER GUIDE

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## Raidho TD8 / TD10 Subwoofer

*Raidho integrated amplification and DSP platform with Hypex technology*

### PURPOSE

A practical guide for experienced owners, dealers and installers who want to configure the integrated Raidho DSP platform safely, preserve the factory tuning, and optimize integration with a high-end music system.

# TD8 / TD10

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# Before You Begin

The Raidho TD8 and TD10 are delivered as complete, factory-engineered subwoofer systems with fully integrated amplification, DSP and driver protection. The electronics use proven Hypex amplifier and DSP technology, extensively configured and tuned by Raidho for the acoustic design, driver and performance targets of each subwoofer. Analogue XLR, RCA and high-level inputs are provided. The USB connection is for configuration only and does not carry USB audio.

## CRITICAL SAFETY

Do not open the amplifier module or remove the rear plate. The product contains hazardous mains voltage and has no user-serviceable parts. Software changes should be made with the listening level low. Never use the Noise function while people are close to the subwoofer.

This guide separates three types of settings:

| Category                      | Guidance                                                                                                                                                            |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Safe to adjust</b>         | Input selection, master volume, preset selection, preset volume offset, signal-detection behaviour and carefully applied EQ.                                        |
| <b>Adjust with care</b>       | Low-pass filters, delay, polarity/invert and room-correction filters. Measure, change one variable at a time and retain a recovery file.                            |
| <b>Factory / service only</b> | Limiter parameters, hardware input-gain configuration, defaults/reset functions, amplifier configuration and any setting not described for end users in this guide. |

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# 1. Software, Cables and Preparation

Hypex Filter Design (HFD) is the Windows application used to configure the integrated DSP platform in the Raidho TD8 and TD10. It can select sources and presets, set volume and power behaviour, create filters and upload complete preset configurations.

## You will need:

- A Windows PC with the current Hypex Filter Design software installed.
- A USB 2.0 Type-A to Mini-B cable.
- The subwoofer connected to mains power and switched on.
- A copy of the original Raidho project/configuration file, where available.
- For acoustic tuning: a calibrated measurement microphone, suitable audio interface and measurement software such as REW or equivalent.

### USB IS CONFIGURATION ONLY

The subwoofer USB port is not an audio input. Continue to feed music through XLR, RCA or the high-level input while the PC is connected by USB.

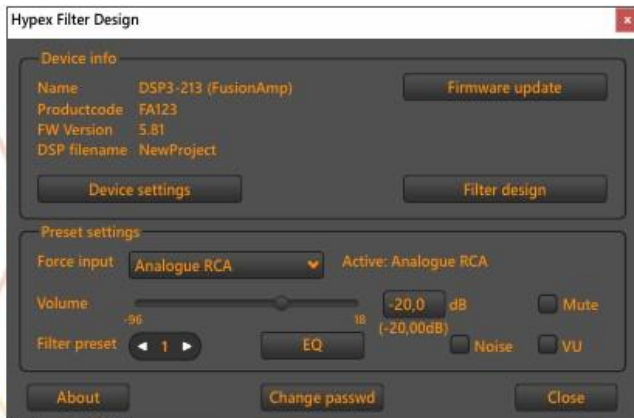
## Recommended preparation

1. Turn the system volume down before connecting or changing settings.
2. Select a familiar, moderate-level test track and keep it paused during uploads.
3. Record the active preset, source and gain-knob position.
4. Create a dedicated folder for factory files, experiments, measurements and dated backups.

## 2. Connecting the Subwoofer and Confirming Communication

5. Install and start Hypex Filter Design.
6. Connect the Mini-B USB cable between the PC and the subwoofer.
7. Connect mains power and switch the subwoofer on.
8. Wait for the subwoofer electronics to complete the LED start-up sequence.
9. Confirm that the HFD main screen displays the connected Raidho subwoofer electronics, device information and an active preset.

change its volume, source and preset.



Picture 1: Main screen

### Device info

When a device is connected via USB, its name, product code and firmware version will be displayed under device info. If a DSP filter settings file has been uploaded, the DSP filename will be shown as well.

There are a few more parameters with which

3. Optical
4. Analogue XLR
5. Analogue RCA

On slave devices the input option “Auto detect” is removed. As slaves are set to follow the master device, “Auto detect” is not really needed. Master devices still have the “Auto detect” input option available.

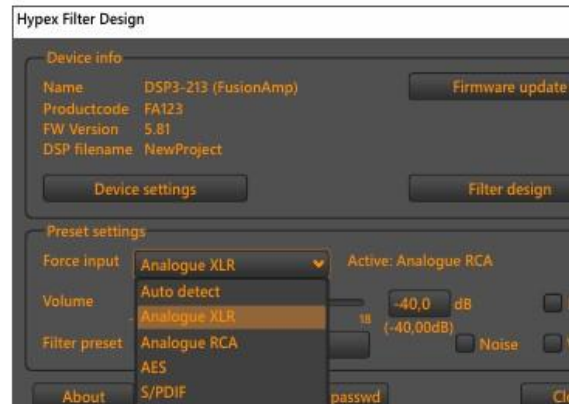


Figure 1. HFD main screen and source selection. The screenshots in the Hypex manual show a generic interface; the controls available in the Raidho TD8 and TD10 are limited to the functions relevant to the integrated subwoofer platform.

### IF NO DEVICE APPEARS

Try a different USB cable and USB port, close and restart HFD, then power-cycle the subwoofer. Avoid passive USB hubs. A charging-only cable will not work.

### 3. Understanding the HFD Main Screen

| Control                | What it does                                                                                               |
|------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Device info</b>     | Shows the detected module, product code, firmware and the DSP/project filename stored in the device.       |
| <b>Force input</b>     | Selects Auto detect, Analogue XLR, Analogue RCA or SUB/high-level input as supported by the one-way model. |
| <b>Active source</b>   | Shows which input is currently carrying the selected signal.                                               |
| <b>Volume</b>          | The digital master volume. Change it in small steps; the arrow keys provide controlled adjustment.         |
| <b>Mute</b>            | Mutes the output. A volume change clears mute.                                                             |
| <b>Filter preset</b>   | Selects Preset 1, 2 or 3.                                                                                  |
| <b>EQ</b>              | Opens the user equalizer associated with the connected device.                                             |
| <b>VU</b>              | Displays input and output levels. Useful for diagnosing missing signal or unintended overload.             |
| <b>Device settings</b> | Opens power, signal-detection, preset-offset and protection settings.                                      |
| <b>Filter design</b>   | Opens the graphical/advanced filter project used to define the actual DSP response.                        |

#### VOLUME WARNING

The value shown in HFD is the digital master volume and interacts with preset offsets and the rear-panel gain control. Always begin at a low level after loading or changing a project.

## 4. Backing Up and Preserving the Raidho Factory Configuration

Before creating any custom tuning, establish a recovery path. HFD project uploads can overwrite the selected preset, and loading all presets can replace the complete filter set.

### Recommended backup procedure

10. Ask your Raidho dealer or distributor for the original TD8/TD10 HFD project file if it was not supplied.
11. Open the factory project in HFD and use Save As to create a read-only master copy with the product name and serial number.
12. Create a second working copy for experiments. Never edit the master copy.
13. Document the three factory presets: P1 = 80 Hz roll-off, P2 = 60 Hz roll-off, P3 = 40 Hz roll-off.
14. Before every major change, save a new version using a date and a short description, for example:  
TD10\_SN1234\_2026-08-04\_roomEQ\_v01.

#### DO NOT USE FORCE DEFAULTS

The Defaults/Force defaults function is not a factory-reset to Raidho tuning. It can return Hypex settings to generic values and may disable protection or remove the intended configuration. Recovery should be performed by reloading the verified Raidho project.

## 5. Volume, Mute, VU and Input Selection

### Input selection

The relevant input choices are analogue XLR, analogue RCA and the high-level/SUB input. Auto detect scans these inputs and locks to the first source it detects. The documented scanning order for this subwoofer platform is XLR, RCA, then High Level Input.

| Input              | Recommended use                                                                                                                                         |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>XLR</b>         | Preferred when the preamplifier or processor offers a balanced subwoofer output. The through connector can feed a second subwoofer.                     |
| <b>RCA</b>         | Use the unbalanced stereo input. Left and right are internally mixed to mono; for a mono signal, connect only the relevant channel.                     |
| <b>High level</b>  | Use when no pre-out is available. Connect both left and right channels for one subwoofer, or the corresponding channel for each of two subwoofers.      |
| <b>Auto detect</b> | Convenient for normal use. If the unit wakes but produces no sound, verify that the detected signal is on the same input selected by the active preset. |

### VU and gain structure

- Use VU to confirm that HFD sees an input signal and that the DSP produces an output.
- If input is present but output is absent, check mute, preset filter content, gain and active input.
- Avoid running the DSP close to full scale. If the protection indicator flashes, reduce playback level or subwoofer gain.
- Use the rear gain knob for convenient day-to-day offset; use preset offsets for repeatable differences between presets.

## 6. Working with the Three Presets

The integrated DSP stores three presets. Each can hold its own source, filter and gain offset. Raidho ships the TD8/TD10 with the following low-pass choices:

| Preset          | Factory purpose                                                                                                                     |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preset 1</b> | 80 Hz roll-off - useful when the main loudspeakers or processor hand over at a relatively high frequency.                           |
| <b>Preset 2</b> | 60 Hz roll-off - a flexible starting point for many full-range loudspeakers.                                                        |
| <b>Preset 3</b> | 40 Hz roll-off - useful when the main loudspeakers already extend deeply and the subwoofer is used primarily for the lowest octave. |

### Choosing the right preset

15. Start with the crossover closest to the intended hand-over frequency of the main loudspeakers.
16. Match level before judging tonal balance. A louder preset will often sound more impressive but is not necessarily better integrated.
17. Listen for bass localization, upper-bass thickness and a gap in energy around the crossover region.
18. Confirm with measurements at the listening position and at nearby positions.

#### **PRESERVE AT LEAST ONE FACTORY PRESET**

When experimenting, keep one original Raidho preset unchanged. Use another preset for room EQ and the third for an alternative crossover or listening preference.

## 7. Standby, Signal Detection and Automatic Source Selection

|        |         |        |
|--------|---------|--------|
| S/PDIF | AES     | S/PDIF |
| S/PDIF | S/PDIF  | S/PDIF |
| S/PDIF | TOSlink | S/PDIF |

Table 1: Slave unit source lock

### 3. Device settings DSP3-213

Each module needs to be set up according to the application. On the main screen click the **Device settings** button to open the screen shown below. In this chapter we will explain the parameters, group by group.



Picture 8: Device settings screen

#### Preset volume offsets

The preset volume is an offset relative to master volume. This volume can be set each preset individually. This volume ranges from -24dB to +24dB.

#### Input gain configuration

The input gain is adjustable by soldering signal jumpers on the DSP board. The input gain configuration on screen is just here to visualize that the input gain jumpers are soldered, it does not change the gain itself.

**WARNING:** This is an advanced modification. Soldering experience is required. Please refer to the FusionAmp manual for more information.

#### Digital audio channel select

For your 2- and 3- way devices, you must instruct the DSP which audio channel in the digital signal it has to use. By default, it adds left and right for subwoofer applications, but you can change the setting to "Left" or "Right" for stereo applications, so the DSP outputs only the left or right signal.

Figure 2: Device settings in HFD. The precise layout can vary by HFD and firmware version.

| Setting                          | Guidance                                                                                                                                                                     |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Activate signal detection</b> | Allows the subwoofer to wake when an analogue input signal is detected and to enter the selected power-down mode after the configured period without signal.                 |
| <b>Off after</b>                 | Sets the delay before automatic power-down. Hypex documents 15 minutes as the default.                                                                                       |
| <b>Sensitivity ON/OFF</b>        | Four analogue sensitivity levels are available; Level 1 is the most sensitive and Level 4 the least sensitive. Use a less sensitive level if the subwoofer wakes from noise. |
| <b>Standby</b>                   | Consumes less than 0.5 W and scans analogue inputs. This is the appropriate mode for the Raidho TD8 and TD10.                                                                |

**Wake on line**

Forces the unit to switch on when mains power is applied, regardless of signal detection.

**Volume on start**

Applies a known digital master volume at start-up. Use a conservative value to prevent surprises.

**FORCED INPUT BEHAVIOUR**

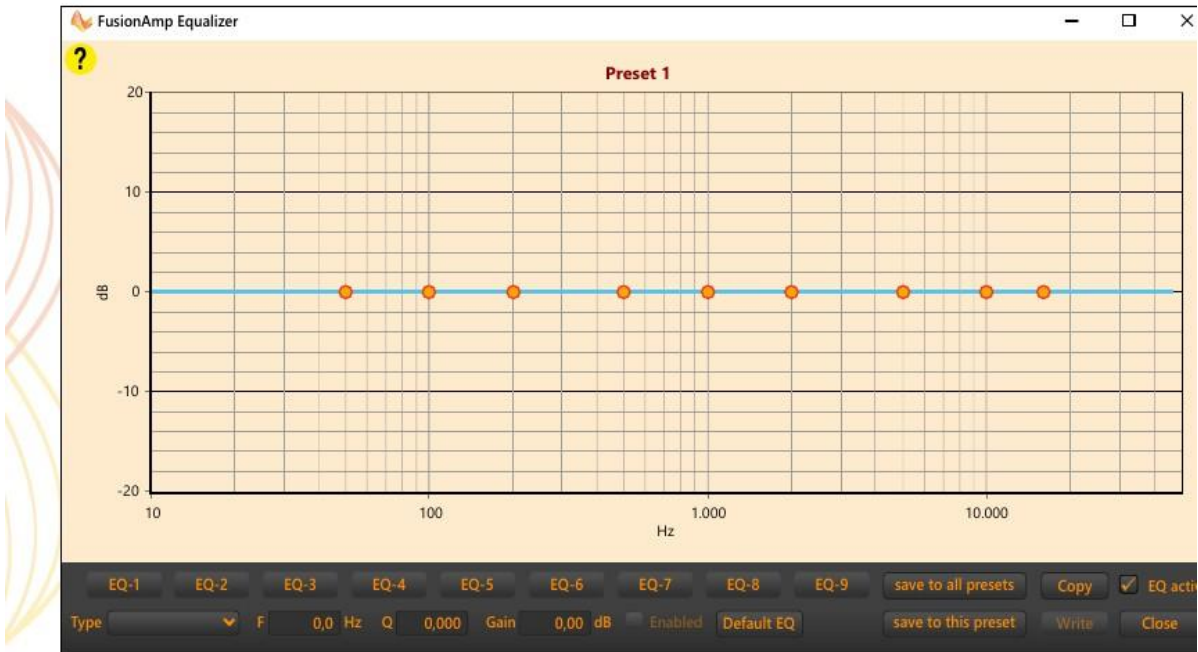
Hypex notes that an analogue signal on another input can wake the module even when a different analogue input is forced. The unit may therefore wake without producing sound. This is not necessarily a fault.

## 8. The Equalizer: Fast System and Room Tuning

The Equalizer is the most accessible place to make limited tonal corrections without redesigning the complete factory filter. Use it for broad, measured adjustments rather than speculative boosting.

### 9. Equalizer

A parametric equalizer is available in the DSP3-224 and is added to the DSP3-213 as of firmware version v1.4. The equalizer is placed right after the input selection, before the signal is provided to the three channels.



Picture 69: Equalizer screen, no band selected

By default, all biquads are of type "BoostCut" with a gain of 0dB, making the equalizer to pass audio without any alterations. Up to 9 biquads are available to prepare the signal, before it is fed to the output router. Therefore, all three channels use the same equalizer. The equalizer settings are stored in the preset settings, making that every preset has its own equalizer.

There are several ways to enable a biquad in the EQ. For example, push button **EQ-4**. This will select the default biquad with a center frequency of 500Hz. This can be changed in the frequency edit control. You can also drag the biquad over the screen, adjusting the frequency and gain at the same time. Rotating at that moment the mouse-wheel, it will change the Q-factor.

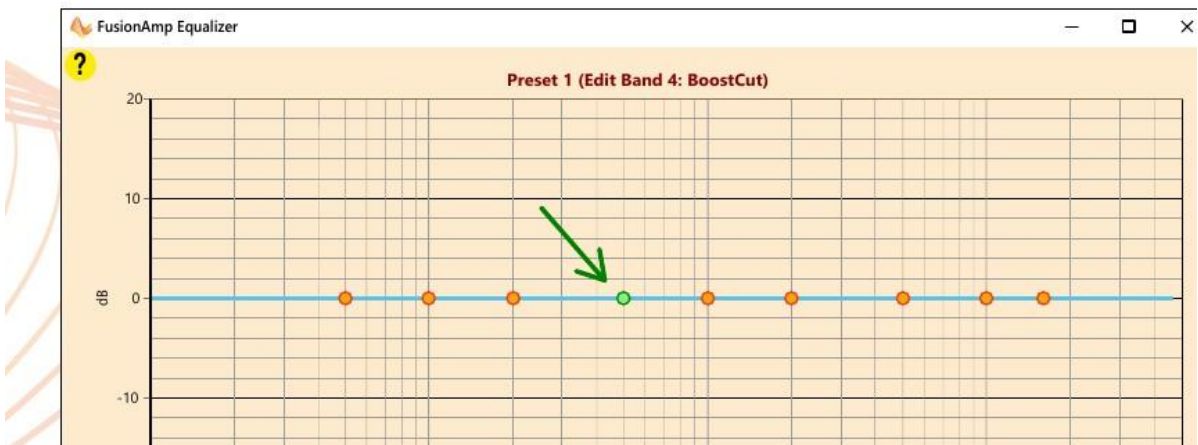


Figure 3. HFD Equalizer screen. The equalizer can store preset-specific filter settings and upload them to the connected DSP.

## A safe parametric-EQ workflow

19. Measure the subwoofer and main loudspeakers together at the main listening position.
20. Identify broad peaks that repeat across several nearby microphone positions.
21. Apply cuts first. A reduction of 2-4 dB with moderate Q is usually a better starting point than a deep, narrow correction.
22. Avoid filling deep nulls. They are commonly caused by cancellation and require placement, phase/delay or multiple-subwoofer solutions rather than electrical boost.
23. Re-measure after every change and compare with the bypassed/original preset at matched level.
24. Save the EQ to the intended preset and document frequency, gain and Q.

### BASS EQ PRINCIPLE

Room peaks are often correctable; deep nulls usually are not. Large boost at very low frequency consumes amplifier and driver headroom quickly and can activate the limiter or increase distortion.

| Parameter             | Meaning                                                                                                            |
|-----------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Frequency</b>      | The centre frequency of the correction.                                                                            |
| <b>Gain</b>           | Positive values boost; negative values cut. Prefer cuts for room-mode control.                                     |
| <b>Q</b>              | Controls bandwidth. Low Q is broad; high Q is narrow. Use moderate Q for robust corrections over a listening area. |
| <b>Bypass/disable</b> | Use to compare the correction without deleting it.                                                                 |
| <b>Copy/write</b>     | Use carefully to transfer or upload settings. Confirm the target preset before writing.                            |

## 9. Filter Design: Low-Pass, EQ, Phase, Delay and Polarity

Filter Design exposes the complete DSP signal path. It should be used only after a factory project has been saved and a recovery file is available.

filters.

The first step is equalising the magnitude responses of the drivers flat over their entire useable frequency range.

To do this you can use shelving filters, and boost/cut sections. A sharp peak followed by an equally sharp dip can be corrected using a second-order shelving filter with a high Q.

Exercise care when deciding what to correct. When correcting for diffraction errors, **do not exceed a Q of 3** because this could make it worse. Errors that are caused inside the driver, or internal cabinet resonances that emanate through the same diaphragm, may be corrected ruthlessly - provided the measurement has sufficient resolution to pin them down.

drivers themselves. Exceptions are room resonances (if the response is not correct truncated) and diffractions on repetitive patterns.

The second step is designing the actual crossover filters. All the usual strategies work. Delaying higher frequency drivers with respect to lower-frequency ones is a powerful alternative to using asymmetric slopes and yields substantially improved coherence through the crossover region.



Picture 32: Graphical filter design screen

Figure 4. HFD graphical Filter Design screen. It combines routing, channel gain/delay and a magnitude/impulse/phase display.

| Function              | Use in a subwoofer                                                                                                                                         |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LowPass 1 / 2</b>  | First- or second-order low-pass sections. Multiple second-order sections can be cascaded to create higher-order slopes.                                    |
| <b>HighPass 1 / 2</b> | Useful as a protective subsonic filter. Do not remove the factory high-pass behaviour unless directed by Raidho.                                           |
| <b>Shelf 1 / 2</b>    | Broad tonal shaping, including low-frequency extension or roll-off.                                                                                        |
| <b>Boost/Cut</b>      | Parametric peak/dip EQ using centre frequency, gain and Q.                                                                                                 |
| <b>AllPass 1 / 2</b>  | Changes phase without directly changing magnitude. This is an expert tool.                                                                                 |
| <b>Delay</b>          | Time-aligns the subwoofer with the main system. Delay can correct timing when the subwoofer is physically closer or the main speakers include DSP latency. |
| <b>Invert</b>         | Reverses polarity. Compare measured summation around the crossover region, not merely subjective bass quantity.                                            |
| <b>Gain</b>           | Sets channel-level offset within the filter project. Keep sufficient headroom.                                                                             |

### Graph header

The header shows what channel is currently selected (highlighted bar). To select another channel, just click on the channel name. Also, it displays the gain and delay of all channels. Each channel can be muted/unmuted by clicking the "Mute" box in the header. In the same way, channels can be added to the sum-response by clicking the "Sum" box. Red means, the channel is excluded from the sum-response, a green "Sum" box indicates, the channel is part of the sum-response.

### Graph left pane

When you select a filter in the graph, its parameters will show up in this pane at the top. Below the filter object parameters, the channel parameters are presented. Here you can edit the channel gain, channel delay and channel invert option. Also, the channel name and output name can be changed, although these changes will be added to your project, they are not uploaded to a DSP, so the names are more for your convenience. In the channel parameter box, the number of remaining filter objects is displayed and when you have recording hardware installed on your computer, a recording button will be visible.

At the bottom of the left pane, general settings are presented like smoothing and measurement sampling rate.

### Graph right pane (filter graph)

In this graph, you can view and/or change the response of the selected channel. Add/Disable/Delete filter objects, show/hide impulse responses, show/hide sum response.

### Graph bottom pane

Select the magnitude/impulse or step graph, import/clear/save channel impulse response, view cursor position in the magnitude graph or switch to the advanced screen by clicking **Advanced** button.

### Filter objects



In the Magnitude graph, the thick orange line represents the result of the filter sections or the measured response. The red line represents the measured response (impulse response). You can show or hide the measured speaker response by checking or unchecking the checkbox "Show" at the bottom of the screen, or by checking/unchecking the box labelled with the channel number at the top of the graph (in the example "1"). Lowpass filter objects are always coloured blue, high pass filter objects red. A selected filter object is green. When more filters are placed on top of each other, the colour will be dark red. All other filters are orange coloured. It is possible to temporarily disable a filter, just to hear the effect after uploading the filter-parameters to the attached DSP. These filter objects are drawn Grey.

When a filter object is selected (by left-clicking its circle), the response of that particular filter is drawn as an aqua coloured line. When no objects are selected (by left clicking somewhere in the graph, not on a filter object) the effect of all enabled filter objects is drawn as a single aqua coloured line.

When channels are added to the sum, the sum line can be displayed by checking "Show sum of all selected channels" at the right top of the graph. The sum is drawn in colour black.

Impulse responses of other channels can also be added to your graph. They will be drawn in a very light purple colour when enabled by checking the box corresponding to its channel number at the top of the graph (in the example channel 2 would be an option, but it has no impulse response loaded, so checkbox "2" is disabled).

You can scroll the Y-axis by left clicking and holding somewhere in the graph (NOT on a filter object) and dragging the graph up or down.

### Adding a filter object

Select a channel by clicking on the channel name in the channel header section (top of the screen):



Figure 5. Adding and editing filter objects in the graphical Filter Design screen.

## 10. A Disciplined Room-Integration Workflow

High-end integration is not achieved by making the subwoofer prominent. The objective is smooth, phase-coherent extension that preserves the speed, tonal balance and spatial presentation of the main loudspeakers.

### Step 1 - Placement before EQ

- Measure several practical positions before creating filters.
- Avoid placing the subwoofer exactly halfway between two room boundaries.
- Use listening-position measurements plus a small spatial average around the head area.
- Where possible, optimize the distance from front and side walls independently.

### Step 2 - Select the crossover region

- Begin with the appropriate Raidho preset: 80, 60 or 40 Hz.
- Measure the main loudspeakers alone, subwoofer alone and the combined response.
- Look for smooth summation through at least one octave around the crossover.

### Step 3 - Match level

- Adjust level until the combined response extends naturally without a broad hump.
- Use a level-matched bypass comparison; a 1-2 dB difference can dominate preference.

### Step 4 - Optimize polarity, phase and delay

- Compare normal and inverted polarity. Keep the option that gives stronger, smoother acoustic summation around the crossover rather than simply more deep bass.
- If timing remains poor, add delay in small increments and re-measure.
- Do not use delay to repair room modes. Delay is for time/phase alignment.

### Step 5 - Apply restrained EQ

- Correct the largest repeatable peaks first.
- Limit very-low-frequency boost and verify protection headroom at realistic playback levels.
- Judge the result with music after measurements indicate a technically sound solution.

#### MEASUREMENT DISCIPLINE

Do not optimize a single microphone point to ruler-flat response. A subwoofer must work over a listening area, and narrow corrections based on one point can make nearby positions worse.

## 11. Uploading, Auditioning and Validating Changes

HFD can upload the current preset or all presets. Treat every upload as a configuration change that may replace existing DSP content.

### Safe upload sequence

25. Save the working project before uploading.
26. Confirm the target preset in both HFD and your notes.
27. Reduce master volume and pause playback.
28. Upload only the current preset unless you intentionally want to replace all three.
29. After upload, verify source, mute status and output at a very low level.
30. Measure the result, then raise playback level gradually.
31. Save the validated project with a new version number.

#### NEVER UPLOAD AN EMPTY PRESET

The integrated DSP does not produce output without a valid filter. An incomplete or empty project can therefore create silence or remove protective filtering.

### Validation checklist

- No unexpected change in input selection or start-up volume.
- Correct preset LED and active source.
- No repeated Prot LED activity at normal listening levels.
- Smooth crossover summation and no new narrow peaks.
- No audible noise, pumping or localization of the subwoofer.
- Original factory preset remains available for comparison and recovery.

## 12. Using Two TD Subwoofers

Two subwoofers can reduce seat-to-seat variation and provide more uniform room excitation. The balanced XLR through connector is directly connected to the XLR input and can be used to daisy-chain a second subwoofer, subject to the source output capability.

| Configuration            | Guidance                                                                                                                                                                                      |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mono pair</b>         | Feed the same mono signal to both subwoofers. Optimize positions, then level and delay each unit if the system provides independent control.                                                  |
| <b>Stereo pair</b>       | Feed left signal to the left subwoofer and right signal to the right subwoofer. This can preserve channel-specific low-frequency information but may not produce the smoothest room response. |
| <b>High-level pair</b>   | Connect each subwoofer to the corresponding amplifier channel. Keep gain-knob positions matched before fine tuning.                                                                           |
| <b>Daisy-chained XLR</b> | Connect source to Sub 1 XLR input, then Sub 1 through to Sub 2. Use identical presets as a starting point.                                                                                    |

### INDEPENDENT OPTIMIZATION

The best dual-sub result often requires different placement, level and delay for each subwoofer. HFD configures one connected unit at a time; label and save each unit's project separately.

## 13. FIR Filters and Expert Functions

Recent versions of the integrated DSP platform and HFD support FIR processing. FIR filters can implement complex magnitude and phase correction, but they require external filter-generation software, the correct sample rate and exact tap counts. The Hypex documentation specifies 93,750 Hz as the DSP processing sample rate for FIR creation and warns that uploading a project can overwrite the active preset.

### When FIR may be appropriate

- A professionally measured installation with a controlled target response.
- Phase-linear crossover experimentation where system latency is acceptable.
- Integration with external room-correction workflows managed by an experienced installer.

### Why FIR is not the default recommendation

- It adds latency.
- Incorrect coefficient format, tap count or routing can produce silence or unintended response.
- A sophisticated filter cannot compensate for poor subwoofer placement or severe spatial variation.
- The original Raidho protection and voicing must remain intact.

#### EXPERT-ONLY AREA

FIR, all-pass networks, microphone-correction files, ASIO measurement and the advanced biquad screen are outside normal owner setup. Use the full Hypex Filter Design Manual and retain a verified factory recovery file.

## 14. Settings That Should Not Be Changed

| Setting                                      | Raidho guidance                                                                                                                                                                   |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Soft-clip limiter power and impedance</b> | These parameters protect the driver and determine limiter behaviour. Do not change the Raidho values.                                                                             |
| <b>Attack and release</b>                    | Limiter timing affects both protection and sound. Leave the factory settings unchanged.                                                                                           |
| <b>Soft-clip enabled state</b>               | Do not disable or enable it without knowing the Raidho factory configuration.                                                                                                     |
| <b>Input gain configuration</b>              | HFD may display hardware jumper settings; changing the on-screen indication does not alter the hardware. Physical modification requires soldering and is not an owner adjustment. |
| <b>Defaults / Force defaults</b>             | Generic Hypex defaults are not the Raidho factory configuration and can remove intended settings.                                                                                 |
| <b>Amplifier / device configuration</b>      | Do not alter the detected amplifier type, channel setup or hardware options.                                                                                                      |
| <b>Firmware update</b>                       | Perform only when instructed by Raidho or Hypex and only with a complete backup.                                                                                                  |
| <b>Password protection</b>                   | Use cautiously. A forgotten password can complicate recovery and service.                                                                                                         |

### PROTECTION INDICATOR

Random Prot blinking indicates limiting; one blink per second indicates high temperature; two blinks per second indicates over-temperature; steady Prot can indicate a critical/fatal error. Reduce level or power-cycle only as described in troubleshooting.

## 15. Troubleshooting and Recovery

| Symptom                                  | Action                                                                                                                                    |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| HFD does not detect the subwoofer        | Confirm mains power, use a data-capable Mini-B cable, connect directly to the PC, restart HFD and power-cycle the subwoofer.              |
| <b>Input visible, no output</b>          | Check mute, active preset, filter content, master volume, preset offset and rear gain control.                                            |
| <b>Subwoofer wakes but is silent</b>     | A different analogue input may have triggered wake-up while the selected/forced input has no signal. Check Active source and Force input. |
| <b>Preset LED blinks slowly</b>          | The module is muted.                                                                                                                      |
| <b>Preset LEDs blink during scanning</b> | Auto source selection is scanning; output is muted during the scan cycle.                                                                 |
| <b>Prot flashes randomly</b>             | The amplifier is limiting. Reduce level and check EQ boost and gain structure.                                                            |
| <b>Prot blinks once per second</b>       | High temperature; reduce level and ensure ventilation is unobstructed.                                                                    |
| <b>Prot blinks twice per second</b>      | Over-temperature shutdown; switch off and allow the unit to cool.                                                                         |
| <b>Prot remains steadily lit</b>         | Possible critical/DC error. Power-cycle once. If it remains, stop using the subwoofer and contact an authorized Raidho dealer.            |
| <b>Custom tuning sounds wrong</b>        | Return to the preserved factory preset or reload the verified factory project at low volume.                                              |
| <b>No sound after upload</b>             | The preset may be empty, muted or missing a valid filter. Reload a complete known-good project.                                           |

## Appendix A - Filter Terminology

| Term                      | Definition                                                                                                         |
|---------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Cut-off frequency</b>  | The frequency around which a high-pass or low-pass transition occurs.                                              |
| <b>Slope / order</b>      | How rapidly output changes beyond the cut-off. Higher order means a steeper transition and greater phase rotation. |
| <b>Q factor</b>           | A measure of filter bandwidth/resonance. Higher Q produces a narrower correction.                                  |
| <b>Shelf</b>              | A broad change that reaches a new level above or below a transition frequency.                                     |
| <b>Biquad</b>             | A second-order digital filter building block. HFD provides multiple biquad functions per channel.                  |
| <b>Polarity inversion</b> | Reverses the signal sign. It is not the same as continuously variable phase.                                       |
| <b>Delay</b>              | Shifts the subwoofer later in time. It cannot create negative delay.                                               |
| <b>Phase</b>              | Frequency-dependent timing relationship. Correct phase alignment improves summation through the crossover.         |
| <b>Headroom</b>           | The margin between normal operating level and clipping/limiting.                                                   |
| <b>Room mode</b>          | A resonance/cancellation pattern caused by room dimensions and boundary interactions.                              |

## Appendix B - Tuning Worksheet

| Item                        | Record                                                                                                         |
|-----------------------------|----------------------------------------------------------------------------------------------------------------|
| Product / serial number     | _____                                                                                                          |
| Room and listening position | _____                                                                                                          |
| Input used                  | XLR / RCA / High level                                                                                         |
| Factory preset retained     | P1 / P2 / P3                                                                                                   |
| Working preset              | P1 / P2 / P3                                                                                                   |
| Rear gain position          | _____                                                                                                          |
| Main speaker roll-off       | _____                                                                                                          |
| Selected crossover          | 40 / 60 / 80 Hz / Custom                                                                                       |
| Polarity                    | Normal / Inverted                                                                                              |
| Delay                       | _____                                                                                                          |
| EQ filters                  | Frequency _____ Gain _____ Q _____<br>Frequency _____ Gain _____ Q _____<br>Frequency _____ Gain _____ Q _____ |
| Project filename            | _____                                                                                                          |
| Measurement filename        | _____                                                                                                          |
| Date / installer            | _____                                                                                                          |

## Appendix C - Source Documents

This guide is based on the following supplied documents:

- Raidho TD8 / TD10 Subwoofer - Quick Guide.
- Hypex Filter Design Manual.
- Hypex FusionAmp User Guide, covering the underlying one-way amplifier and DSP technology.

The Hypex manuals describe a wider family of technologies and multiple firmware/software versions. Screen labels and available options may therefore differ slightly from the screenshots. Where this guide gives a Raidho-specific warning, the intention is to preserve the TD8/TD10 factory tuning and driver protection.

### SUPPORT

For factory project files, recovery assistance or uncertainty about protection settings, contact your authorized Raidho dealer or distributor before uploading further changes.